

## New North American *Pulverro* Pate with a Key to the Species (Hymenoptera: Sphecidae)

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*Pulverro* Pate is a member of the sphecid subfamily Pemphredoninae and its distribution is limited to western North America. These wasps are relatively small, mostly black and average 3 mm in length. They are predaceous on thrips and usually nest in sandy ground or soil that has been recently disturbed (Bohart and Grissell, 1972). Most species occur in arid areas of the west where they visit native flowers but show no particular specificity.

*Pulverro* contains 11 species, 6 previously described (*monticola* Eighme, *costano* Pate, *mescalero* Pate, *constrictus* (Provancher), *laevis* (Provancher), and *columbianus* (Kohl)) and 5 described in this paper (*boharti*, *patei*, *eighmei*, *coconino* and *mexicanus*). In Pate's second publication on the subtribe Ammoplanina (1939) he suggested the presence of two species groups in *Pulverro* but did not set them apart with characters. With the collection of additional specimens and new species, it appears that there are two fairly well defined species groups, the *mescalero* group and the *laevis* group. The *mescalero* group contains 5 species and is distinguished by the following: males; mandible with ventral edge simple, without tooth or carina, narrowing apically (Fig. 5); scutum with apicolateral corners squared (Fig. 13), extending forward over pronotum (Fig. 2); females; scutum same as males; frons with tumid areas basad of antennal sockets, median area usually depressed. The *laevis* group contains 6 species and is distinguished by the following: males; mandible with ventral edge having a prominent tooth medially or carina apically (Figs. 3, 4); scutum with apicolateral corners rounded (Fig. 12), not extending forward over pronotum (Fig. 1); females; scutum same as males; frons without tumid areas basad of antennal sockets; median area forming a smooth carina, usually terminating approximately halfway between median ocellus and basal edge of clypeus.

In this paper I describe 5 new species and provide a key to the valid species. A later paper will present a revision of *Pulverro* and discuss relationships between the species.

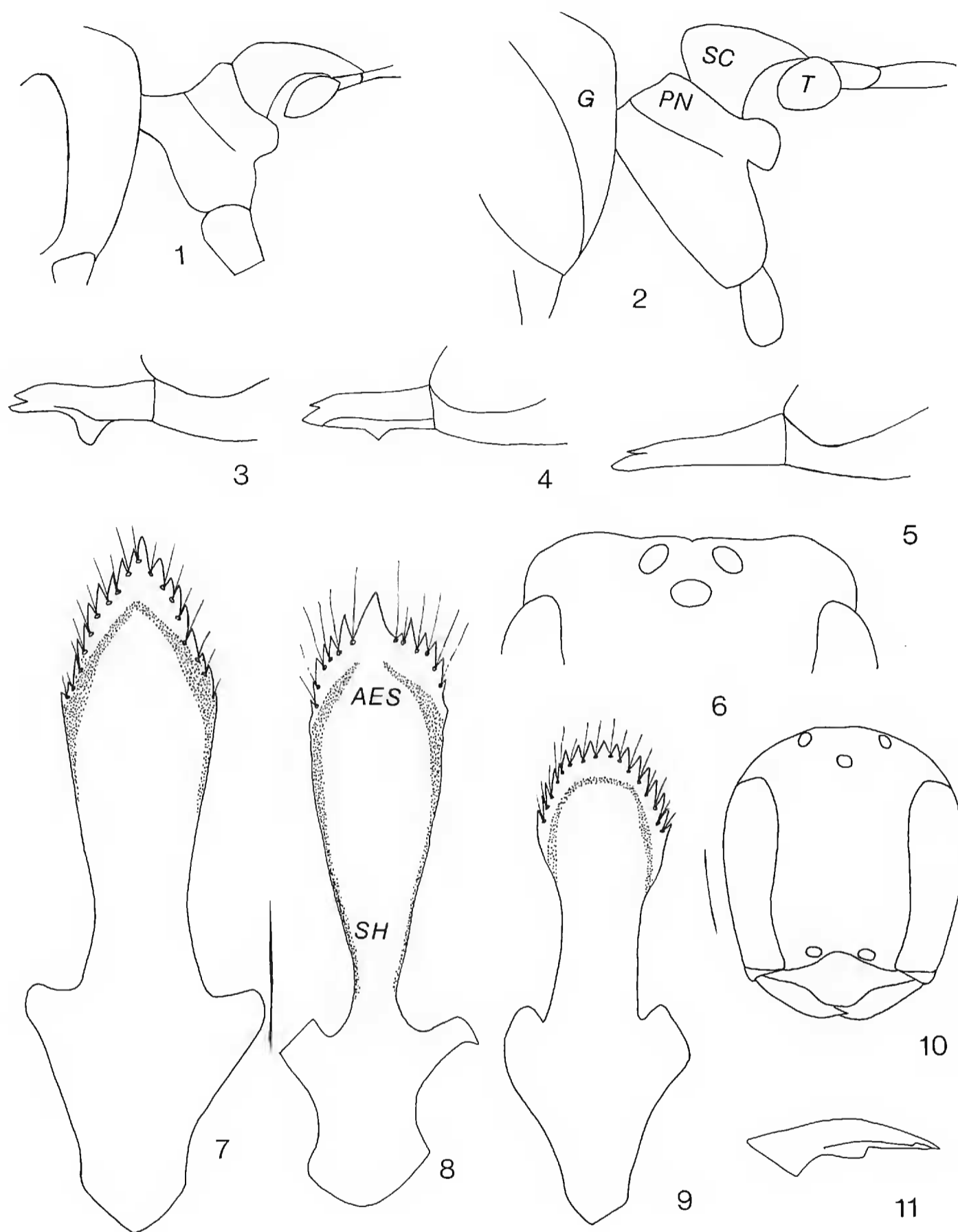
### KEY TO MALE *PULVERRO*

1. Mandible with ventral edge simple, without tooth or carina, narrowed apically (Fig. 5); scutum with apicolateral corners squared (Fig. 13), extended forward over pronotum (Fig. 2) (*mescalero* group) . . . . . 2
- Mandible with ventral edge having prominent tooth medially (Figs. 3, 4) or carina apically, mandible enlarged apically; scutum with apicolateral corners rounded (Fig. 12), not extended forward over pronotum (Fig. 1) (*laevis* group) . . . . . 6

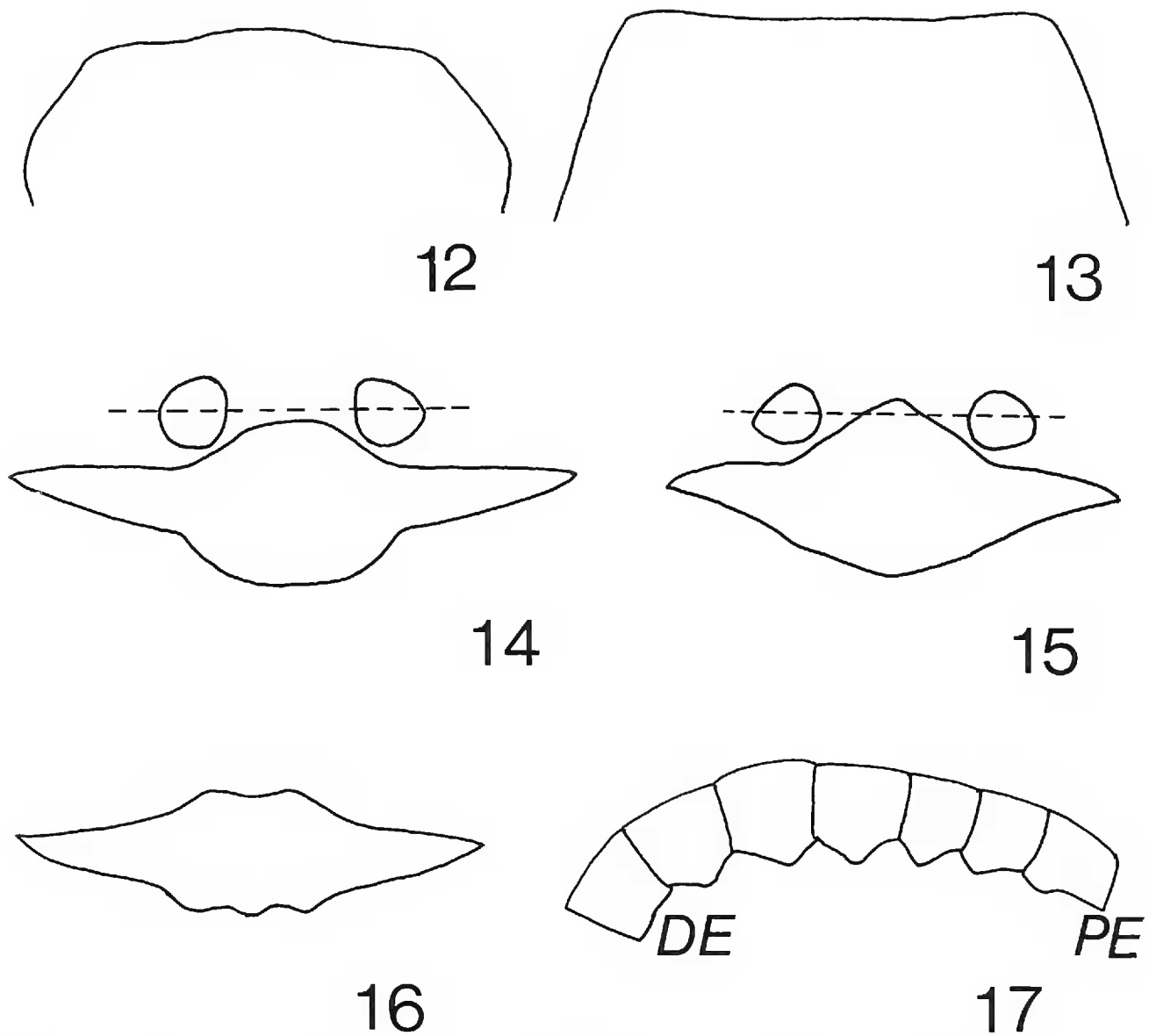
2. Mandible with medioventral translucent tooth on inner margin (Fig. 11) ..... 3
  - Mandible without medioventral translucent tooth on inner margin ... 4
3. Clypeus mediobasally with prominent angular process; abdominal sternum 8 occasionally with apicomedian tooth larger than lateral teeth (as in Fig. 8) ..... *columbianus* (Kohl)
  - Clypeus mediobasally with small, nipple-like projection, abdominal sternum 8 with teeth approximately equal size (as in Fig. 7) ..... *monticola* Eighme
4. Antennal flagellomeres 1-5 (at least) nodulate ventrally (Fig. 17) ..... 5
  - Antennal flagellomeres not nodulate ventrally ..... *mescalero* Pate
5. Clypeus broadly triangular, lacking basomedial nipple-like projection; flagellomeres ventrally mostly brown to black ..... *mexicanus* N. J. Smith
  - Clypeus narrowly triangular, with basomedial nipple-like projection; flagellomeres ventrally entirely yellow ..... *boharti* N. J. Smith
6. Clypeus basally with highly polished area ..... 7
  - Clypeus basally without polished area ..... 8
7. Sterna 4 and 5 with erect tufts of white hair when viewed laterally; sternum 5 with median, tooth-like carina projecting distally; sternum 8 rounded apically (Fig. 8) ..... *coconino* N. J. Smith
  - Sterna 4 and 5 without erect tufts of hair; sternum 5 without median tooth-like carina; sternum 8 pointed apically (Fig. 7) ..... *constrictus* (Provancher)
8. Mandibles with prominent tooth medioventrally (Figs. 3, 4); clypeus apicolaterally with sharp points ..... 9
  - Mandibles with only a low carina apicoventrally; clypeus apicolaterally without sharp points ..... 10
9. Mandible with ventral tooth large and rounded apically (Fig. 3); clypeus polished, without silver hair ..... *laevis* (Provancher)
  - Mandible with ventral tooth moderate in size and pointed apically (Fig. 4); clypeus not polished, with silver hair ..... *costano* Pate
10. Clypeus apically with 3 serrations (Fig. 16), mediobasally without a nipple-like projection; notauli present but obscure ... *eighmei* N. J. Smith
  - Clypeus apically truncate, mediobasally with a nipple-like projection; notauli deeply impressed ..... *patei* N. J. Smith

KEY TO FEMALE *PULVERRO*

1. Scutum with apicolateral corners squared (Fig. 13), extended over pronotum (Fig. 2); frons with tumid areas above antennal sockets, median area usually depressed (*mescalero* group) ..... 2
  - Scutum with apicolateral corners rounded (Fig. 12), not extended over pronotum (Fig. 1); frons without tumid areas above antennal sockets, median area with low carina, usually terminating about halfway between median ocellus and clypeus (*laevis* group) ..... 5
2. Upper frons punctures 1-3 puncture diameters apart, interspaces usually polished ..... 3
  - Upper frons punctures no more than 1 diameter apart, usually less, interspaces dull ..... 4



Figs. 1-11. 1, 2, lateral view of scutum and pronotum; 1, *P. costano*, female; 2, *P. monticola*, male, G—gena, SC—scutum, T—tegula, PN—pronotum. 3-5, male, lateral view of mandible and lower part of head; 3, *P. laevis*; 4, *P. costano*; 5, *P. monticola*. 6, *P. mexicanus*, male, front view of head. 7-9, male sternum 8, ventral view; 7, *P. constrictus*; 8, *P. coconino*, AES—apical end of sternum, SH—shaft; 9, *P. costano*. 10, *P. patei*, female, face. 11, *P. monticola*, male, dorsal view of mandible.



Figs. 12-17. 12, 13, dorsal view of scutal shoulders, male; 12, *P. costano*; 13, *P. monticola*. 14, 15, front view of clypeus and antennal sockets, female; 14, *P. constrictus*; 15, *P. coconino*. 16, *P. eighmei*, male, front view of clypeus. 17, *P. mexicanus*, male, lateral view of basal flagellomeres; DE—distal end, PE—proximal end.

- 3. Clypeus evenly covered with sparse silvery pubescence, head obviously wider than long (0.88 as long as wide,  $n = 3$ ) ..... *mescalero* Pate
- Clypeus medially highly polished, sparse silver pubescence laterally, head about as long as wide (1.00 as long as wide,  $n = 3$ ) ..... *boharti* N. J. Smith
- 4. Frons with tumid areas strongly delineated; head much wider than long (0.82 as long as wide,  $n = 3$ ); clypeal disc wider than long, slightly polished ..... *monticola* Eighme
- Frons with tumid areas slightly delineated; head slightly wider than long (0.96 as long as wide,  $n = 3$ ); clypeal disc about as long as wide, highly polished ..... *columbianus* (Kohl)
- 5. Clypeus globose, without silvery pubescence, polished; occipital carina present ventrally ..... 6
- Clypeus slightly convex, somewhat flattened, covered with silvery pubescence; occipital carina absent or evanescent ventrally ..... 8

6. Upper frons sparsely punctate, polished, concave; scutum flattened, polished, notauli deeply impressed . . . . . *patei* N. J. Smith  
 – Upper frons densely punctate, not polished, somewhat convex; scutum convex, not polished, notauli moderately impressed . . . . . 7
7. Frontal carina sharp; species collected in interior areas of northern and central California . . . . . *costano* Pate  
 – Frontal carina evanescent; species collected along southern California coast . . . . . *laevis* (Provancher)
8. Stigma light brown to yellow; frontal carina evanescent, scapal basins not well differentiated; occipital carina evanescent ventrally . . . . .  
 . . . . . *eighmei* N. J. Smith  
 – Stigma dark brown to black; frontal carina and scapal basins well differentiated; occipital carina absent ventrally . . . . . 9
9. Clypeus extended dorsad past midline of antennal sockets (Fig. 15), with sparse silvery pubescence, apical half often yellow-brown; northern Arizona and southern Utah . . . . . *coconino* N. J. Smith  
 – Clypeus not extended dorsad past midline of antennal sockets (Fig. 14), with moderate silvery pubescence, only tip yellow-brown; mostly southern California deserts . . . . . *constrictus* (Provancher)

*Pulverro boharti* N. J. Smith, NEW SPECIES

*Holotype male*.—Length 3 mm. Black; mouthparts, antennae ventrally, foretibia, mid and hindtibia at knees, foretarsi and mid and hindtarsi at base yellow. Wing veins brown, stigma dark brown. Body with sparse hair, abdominal segments with sparse hair, clypeus and lower frons with sparse silver pubescence. Mandibles bidentate, ventrally with apical half not having low carina, narrowing apically; inside ventral margin without hyaline tooth. Clypeus medially subtriangular, apical edge truncate, mediobasal edge with nipple-like projection. Lower frons with low, broad frontal carina medially; scapal basins slightly differentiated, shallow; upper frons rugose. Antennae with basal flagellomeres nodulate ventrally (as in Fig. 17); pedicel strongly nodulate. Midventral line approximately  $\frac{1}{3}$  length of forecoxa.

Scutum with apicolateral corners moderately squared and slightly extended over pronotum (as in Figs. 2, 13), dorsal surface convex and moderately hairy, surface slightly rugose; notauli moderately impressed. Propodeum dorsally with two parallel carinae; reticulate between. Mesopleuron polished, setigerous punctures sparse. Sternum glabrous, highly polished.

Sternum 8 apically serrate and rounded, moderately hairy (as in Fig. 9).

*Female*.—Length 3.5 mm. Markings as in male. Head approximately as long as wide (1.00,  $n = 3$ ). Mandibles as in male. Clypeus broadly and slightly concave apicomediaally; clypeal disc with sparse silver pubescence laterally, highly polished medially. Lower frons with tumid areas basad of antennal sockets moderately developed, converging basomedially, medially with shallow depression; scapal basins strongly defined, lightly silvered apically. Frons with small, shallow, central, circular depression. Upper frons with setigerous punctures moderately spaced (2–

3 puncture diameters apart), polished between in Wyoming specimens, faintly rugose in Arizona specimens.

Scutum with apicolateral corners moderately squared and extended over pronotum (as in Figs. 2, 13); notauli obscure; scutum dorsally convex and rugose. Pygidium trigonal and margined by sharp carina with few punctures laterally.

*Diagnosis.*—*P. boharti* is a member of the group *mescalero*. Major distinguishing characters of the male are the nipple-like projection on the basomedial edge of the clypeus, clypeus with sparse silver pubescence; basoflagellomeres nodulate ventrally (as in Fig. 17) and sternum 8 rounded (as in Fig. 9). Males of *boharti* most closely resemble those of *mescalero* and *mexicanus*. All three lack the translucent tooth on the inner medioventral margin of the mandible but *mescalero* lacks the nodulate basoflagellomeres common to *boharti* and *mexicanus*. The nipple-like projection of the clypeus of *boharti* males separates the species from *mexicanus*, and the latter has a rectangular occipital area behind the compound eyes.

Major female distinguishing characters are: clypeal disc polished medially and with silver pubescence laterally; head approximately as long as wide and upper frons (at least in the Wyoming specimens) sparsely punctate and polished between punctures. Females of *mescalero* are most closely related to those of *boharti*. They are related by their upper frons punctures being only 1–2 puncture diameters apart and polished between punctures. *P. boharti* differs from *mescalero* in having a medially polished clypeus which is sparsely silvered laterally and the head is about as long as wide. *P. mescalero* lacks the polished area on the clypeus and the head is wider than long.

*Type material.*—Holotype ♂ (UCD): WYOMING, *Sweetwater Co.*, 12 mi. s. Green River, 28 July 1969, R. M. Bohart. Paratypes, 15 ♂, 1 ♀, same data as holotype. Other localities (all specimens collected by P. H. Timberlake, UCR, unless otherwise stated): ARIZONA: *Navajo Co.*: Hotevilla, 27 Sept. 1977, 4 ♂, 2 ♀ (R. M. Bohart, UCD); Hotevilla, 30 Aug. 1976, 1 ♂, 1 ♀ (R. M. Bohart, UCD); 3 mi. w. Old Oraibi, 24 Sept. 1964, 1 ♂, 1 ♀; 23 mi. n. Indian Wells, 14 Sept. 1960, 1 ♀. *Coconino Co.*: Tuba City, 24 Sept. 1964, 10 ♂, 6 ♀. *Apache Co.*: 16.6–51.5 mi. se. Round Rock, 28 Aug. 1961, 9 ♂, 11 ♀; 18 mi. sw. Ganado, 29 Aug. 1967, on *Gutierrezia microcephala*, 1 ♂. NEW MEXICO: *McKinley Co.*: 29 mi. s. Gallup, 17 Sept. 1968, 1 ♂; 8 mi. sw. Ramah, 17 Sept. 1968, 1 ♂. UTAH: *Uintah Co.*: Bonanza, 8–30 Aug. 1975, 2 ♂, 1 ♀ (G. E. Bohart, USU). *Duchesne Co.*: Fruitland, 30 Aug. 1949, 1 ♀ (G. F. Knowlton, USU). COLORADO: *Rio Grande Co.*: 5 mi. nw. South Fork, 14 Aug. 1978, 9 ♂ (T. Griswold, personal).

*Etymology.*—*P. boharti* is named after R. M. Bohart in recognition of his systematic work on the ammoplanines and the many specimens and new species that he has collected over the years.

***Pulverro coconino* N. J. Smith, NEW SPECIES**

(Figs. 8, 15)

*Holotype male.*—Length 3.25 mm. Black; mouthparts yellow; foretibia, mid and hindtibia at knees and all tarsi burnished yellow. Wing veins light brown, stigma dark brown. Body mostly glabrous but tiny hairs can be found over most

parts. Clypeal disc with sparse silver pubescence. Mandibles bidentate apically; ventrally with carina developed into 2 (one larger than the other), small, blunt teeth medially. Clypeus with median triangular platform, truncate apically, surrounded laterobasally by highly polished vertically rising ridge, smoothly produced mediobasally to extend well basad and above midline of antennal sockets (as in Fig. 15). Lower frons flat medially, scapal basins not differentiated; upper frons rugose, convex. Antennae entirely dark brown; basal flagellomeres slightly nodulate ventrally. Midventral line of head approximately one-fourth length of forecoxa.

Scutum with apicolateral corners rounded and not extending over pronotum, dorsal surface convex with setigerous punctures moderate (1–2 puncture diameters apart) and polished between. Propodeum dorsal surface with two subparallel carinae, reticulate between. Abdominal sterna 4 and 5 with median erect tufts of hair when viewed laterally; sternum 7 with erect tuft of hair easily visible laterally, pointing back toward tufts on sterna 4 and 5; sternum 5 with median carina produced into tooth pointing distally.

Sternum 8 serrate, subtruncate apically with a large median tooth, not obviously spatulate, moderately hairy (Fig. 8).

*Female*.—Length 3.25 mm. Markings as in male except antennae almost entirely yellow, clypeus burnished yellow on apical half. Clypeus sparsely silvered. Mandibles bidentate apically and without ventral carina or teeth. Clypeus medially with slightly raised trigonal platform, apically evenly rounded, convex, medio-basally produced basad of midline of antennal sockets (Fig. 15). Lower frons medially with low, sharp carina, ending approximately halfway between median ocellus and clypeus; scapal basin shallow, moderately defined; upper frons with setigerous punctures moderate (1–2 puncture diameters apart) and polished between. Midventral line of head long due to absence of occipital carina.

Scutum as in male. Propodeum dorsally with subparallel carinae weakly developed. Abdomen ventrally without distinguishing characters. Pygidium trigonal, margined with sharp carina, punctate evenly over entire surface.

*Diagnosis*.—*P. coconino* is a member of the *laevis* group. Distinguishing characters for male *coconino* are the mediobasal polished area on the clypeus, the unique erect tufts of hair on sterna 4, 5 and 7, and the tooth-like median carina on sternum 5. The closest relative is *P. constrictus*, based on the shared mediobasal polished area of the clypeus found in *coconino* but *constrictus* lacks the abdominal characters.

Distinguishing characters for female *coconino* are the apical half of clypeus burnished yellow and sparsely silvered and clypeus extending upward between antennal sockets (Fig. 15). *P. coconino* and *constrictus* share a flattened, slightly convex, sparsely silvery pubescent clypeus and the absence of the occipital carina ventrally. The clypeus of *constrictus* is entirely black and the mediobasal area is somewhat truncate, not extended past the midline of the antennal sockets (Fig. 14).

*Type material*.—Holotype ♂ (CAS): ARIZONA, *Coconino Co.*, Tuba City, 24 Sept. 1964, on *Chrysothamnus*, P. H. Timberlake. Paratypes: 6 ♂, 5 ♀ (7 with same data as holotype): ARIZONA: *Coconino Co.*: 26 mi. e. Tuba City, 24 Sept. 1964, on *Chrysothamnus*, 3 ♂, 1 ♀ (P. H. Timberlake, UCR). Numerous other specimens

were studied from Emery and Wayne Counties in southern Utah collected at approximately the same time of year by F. D. Parker, D. Viers and T. Griswold.

***Pulverro eighmei* N. J. Smith, NEW SPECIES**  
(Fig. 16)

*Male holotype*.—Length 3 mm. Black; mouthparts, ventral side of antennae yellow; foretibia, mid and hindtibia at knees and all tarsi burnished yellow. Wing veins hyaline to light yellow; stigma brown to yellow (variable in paratypes). Clypeus with sparse to moderate silver pubescence; scapal basins with sparse silver pubescence apically. Mandible bidentate apically; apicoventrally with low carina, mandible widened apically; inside edge without tooth. Clypeus and median area triserrate apically (Fig. 16), with sparse silver pubescence, moderately convex discally. Lower frons without frontal carina, but with flat, narrow, smooth line from clypeus to median ocellus, scapal basins shallow, not well defined; upper frons convex, rugose. Antennal flagellomeres mostly terrete, appearing slightly nodulate ventrally in some specimens, light brown dorsally. Midventral line approximately  $\frac{1}{3}$  length of forecoxa. Occipital carina ventrally evanescent, actually appearing recessed.

Scutum with apicolateral corners rounded (as in Fig. 12), not extended forward over pronotum (as in Fig. 1); dorsal surface convex, rugose; notauli obscure. Mesopleuron shiny but not smooth, somewhat rugose. Propodeum dorsally with numerous, low, longitudinal carinae.

Sternum 8 slightly spatulate, apically serrate and sparsely hairy.

*Female*.—Length 3.5 mm. Markings as in male except stigma only rarely light brown. Mandibles as in male except apicoventrally without carina. Clypeus convex discally with sparse silver pubescence, slightly convex and burnished yellow apically. Lower frons with low, broad carina medially, ending approximately  $\frac{2}{5}$  distance between clypeus and median ocellus, changing to smooth line at that point; upper frons polished but with setigerous punctures dense (equal to or less than one puncture diameter apart); scapal basins shallow, rather broad, tumidity basad of antennal sockets absent. Midventral line as in male; ventral, occipital carina as in male. Scutum, propodeum and mesopleuron as in male. Pygidium margined by sharp carina, medially with longitudinal tumid area, laterally impunctate.

*Diagnosis*.—*P. eighmei* belongs to the *laevis* group. Major distinguishing characters for male *eighmei* are the tri-serrate clypeus and the evanescent, recessed ventral area of the occipital carina. The tri-serrate clypeus alone will distinguish *eighmei* from all other species in the genus.

Distinguishing female characters are the yellow stigma and the evanescent recessed occipital carina. The yellow stigma is unique and will distinguish this sex from all other *Pulverro* females.

*P. eighmei* does not appear to have close relatives, however the evanescent, recessed occipital carina in the female suggests a relationship with *coconino* and *constrictus* which have lost their occipital carina.

*Type material*.—Holotype  $\delta$  (UCD): CALIFORNIA, *San Bernardino Co.*, Kramer Hills, 8 May 1978, on *Machaeranthera tortifolia*, R. W. Brooks. Paratypes: 86  $\delta$ , 63  $\text{f}$ , same data as holotype. Numerous other specimens have been collected



throughout the desert regions of southern California, eastern Nevada, western Arizona and northern Baja, California.

*Etymology.*—*P. eighmei* (pronounced ā-me-ī) is named after Dr. Lloyd E. Eighme, who has contributed significantly to work on *Pulverro*. Dr. Eighme also supplied valuable taxonomic information and specimens as well as criticism on the manuscript.

***Pulverro mexicanus* N. J. Smith, NEW SPECIES**  
(Figs. 6, 17)

*Male holotype.*—Length 3 mm. Black; mouthparts yellow; foretibia, mid and hindtibia at knees, fore and midtarsi burnished yellow. Wing veins dark brown, stigma black. Clypeus and apical edge of scapal basins with dense silver pubescence. Mandibles bidentate apically; apicoventrally lacking the low carina; inner median edge lacking hyaline tooth. Clypeus medially with pentagonal-shaped platform, concave discally, very slightly concave apically. Lower frons medially with broad carina, ending approximately halfway between clypeus and median ocellus; scapal basins sharply defined; upper frons convex, rugose. Occipital region boxlike, extending straight back from compound eye before turning to middle (Fig. 6). Antennal flagellomeres ventrally with basal 6 nodulate (Fig. 17). Midventral line approximately half length of forecoxa.

Scutum with apicolateral corners squared and extending forward over pronotum (Figs. 2, 13), convex dorsally, rugose; notauli moderately excised. Mesopleuron shiny but not polished, slightly rugose. Propodeum dorsally with numerous, longitudinal, low carinae. Female unknown.

*Diagnosis.*—*P. mexicanus* is a member of the *mescalero* group. Major distinguishing characters are: flagellomeres 1–6 ventrally nodulate (Fig. 17); clypeus medially with a pentagonal platform; and occipital area in back of the compound eyes is rectangular (Fig. 6). *P. boharti* and *mescalero* are the nearest relatives, their relationship being discussed under the *boharti* diagnosis. The last two major distinguishing characters will separate *mexicanus* from all other species of the genus. Females of *mexicanus* are not known but would probably resemble those of *mescalero* and *boharti*.

*Type material.*—Holotype ♂ (USU): MEXICO, *Oaxaca*, 3 mi. se. Yahuítlan, 17 Sept. 1974, G. E. Bohart & W. Hanson. Paratypes: 1 ♂, same data as holotype (UCD). MEXICO: *Coahuila*: Monclova, 21 Sept. 1974, 1 ♂ (G. E. Bohart & W. Hanson, USU).

*Etymology.*—*P. mexicanus*, known only from the 3 males listed above, was collected from two widely separated localities in Mexico, and is named for the country of origin.

***Pulverro patei* N. J. Smith, NEW SPECIES**  
(Fig. 10)

*Holotype male.*—Length 3 mm. Black; mouthparts, foretibia, mid and hindtibia at knees and all tarsi yellow. Wing veins light brown, stigma dark brown. Body mostly glabrous; abdominal segments sparsely hairy, clypeus with moderate silver pubescence; lower frons and especially scapal basins with dense silver pubescence. Mandibles bidentate, ventrally with apical half having low carina; inner edge with small, hyaline tooth. Clypeus medially subtriangular, concave discally, apex lat-

erally with tiny, blunt teeth, mediobasally with nipple-like projection. Frons ridged medially, approximately halfway from clypeus to midocellus; scapal basins well defined, shallow; upper frons sparsely punctate but faintly rugose. Antennae entirely black, all segments terete. Midventral line between occipital carina and hypostomal carina approximately  $\frac{3}{4}$  length of forecoxa.

Scutum with apicolateral corners rounded and not extending over pronotum (as in Figs. 1, 12); notauli deeply impressed; setigerous punctures sparse, minutely reticulate between. Propodeal dorsum reticulate with two, parallel longitudinal carinae. Mesopleuron with setigerous punctures sparse, highly polished between. Sternum 6 glabrous, highly polished.

Sternum 8 spatulate, serrate and with long hair.

*Female*.—Length 3 mm. Markings as in male except antennae are almost entirely yellow. Head appearing narrowed, longer than wide (Fig. 10). Mandibles lack low carina and hyaline tooth. Central clypeal disc roundly tumid and highly polished, basal edge extending between antennal sockets, apical edge truncate. Clypeus and frons without silver pubescence. Frons ridged medially, approximately  $\frac{1}{3}$  distance from clypeus to midocellus; upper frons with setigerous punctures sparse, highly polished between; upper median area concave. Propodeum tricarinate. Pygidial plate trigonal and margined by sharp carina, with few punctures laterally.

*Diagnosis*.—*P. patei* belongs in the *laevis* species group. Unique in this species is the fact that males and females appear to be more closely related to different species in their respective sexes. Males, except for the species group characters, would appear to be close to *monticola* and *columbianus* because of the presence of a small hyaline tooth medioventrally on the inside of the mandible (as in Fig. 11) and a small, nipple-like projection mediobasally on the clypeus. Females on the other hand show a close affinity to *costano* and *laevis*, primarily due to the strongly tumid, polished disc on the clypeus much as in *costano* and *laevis*. Characters that definitely relate the male and female are the sparse setigerous punctures on the upper frons and scutum and the smooth, polished appearance of both areas, as well as deeply impressed notauli. Locality records also bear out their relationship.

Good distinguishing characters for the male are the antennae entirely black, terete; the basomedial nipple-like projection on the clypeus, and the highly polished scutum with its sparse, setigerous punctures and deeply impressed notauli. Distinguishing characters for the female: the tumid, polished clypeal disc, the highly polished upper frons with its sparse setigerous punctures and central concavity; the overall narrow appearance of the head (Fig. 10); the dorsally flattened scutum with its sparse setigerous punctures and polished appearance.

*Type material*.—Holotype ♂ (UCD): ARIZONA, Navajo Co., Hotevilla, 27 Sept. 1977, on *Chrysothamnus*, R. M. Bohart. Paratypes, 4 ♂, 1 ♀, same data as holotype. Other paratypes (all collected by P. H. Timberlake, UCR, unless stated otherwise): ARIZONA: Navajo Co.: Dinnebeta Wash, 30 Aug. 1976, 2 ♂ (R. M. Bohart, UCD); 3 mi. w. Old Oraibi, 24 Sept. 1964, on *Chrysothamnus*, 12 ♂, 17 ♀; 11 mi. n. Holbook, 22 Sept. 1964, on *Gutierrezia lucida*, 1 ♂. Coconino Co.: Tuba City and 26 mi. e. Tuba City, 24 Sept. 1964, on *Chrysothamnus*, 5 ♂, 6 ♀. Apache Co.: 24 mi. nw. Concho, 25 Sept. 1964, on *Chrysothamnus*, 1 ♂, 1 ♀; 18 mi. sw. Ganado, 25 Sept. 1964, on *Baileya*, 1 ♂; Steamboat Canyon, 14 Sept. 1961, on *Chryso-*

*thamnus*, 1 ♂. UTAH: Kane Co.: 23 mi. e. Kanab, 23 Sept. 1964, on *Chrysothamnus*, 1 ♂; Glenn Canyon, 25 Sept. 1964, on *Gutierrezia lucida*, 1 ♂. Other specimens studied: NEW MEXICO: Socorro Co.: 3 mi. w. Bingham, 12 Sept. 1961, on *Baileya pleniradiata*, 29 ♂, 1 ♀ (2 ♂, coll. by P. D. Hurd, UCB). Lincoln Co.: 24 mi. w. Carrizozo, 12 Sept. 1961, on *Gutierrezia*, 5 ♂. De Baca Co.: Fort Sumner, 2 Oct. 1965, on *Gutierrezia*, 1 ♂ (G. E. Bohart, USU).

*Etymology*.—*P. patei* is named after V. S. L. Pate, a prolific worker on the Ammoplanina.

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